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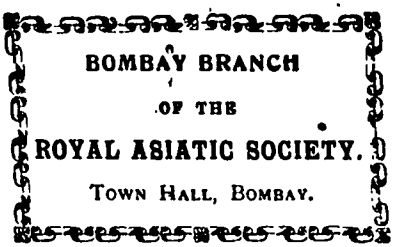

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A HISTORY

OF THE

BRITISH FRESHWATER ALGÆ,

INCLUDING DESCRIPTIONS OF

THE DESMIDEÆ AND DIATOMACEÆ.

WITH

UPWARDS OF ONE HUNDRED PLATES,

ILLUSTRATING THE VARIOUS SPECIES.

BY

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BRITISH

FRESHWATER ALGÆ.

EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1. *Conferva rivularis.* Spores killed by opium (magnified 340 times). — Fig. 2. *Conf. glomerata.* Spores killed by iodine (magnified 500 times). Fig. 3. The same treated with iodine and dried between two plates of glass (magnified to the same extent). Fig. 4. The same beginning to germinate (430 times). Fig. 5. Germination more advanced (290 times). Fig. 6. Germination still more advanced. — Fig. 7. *Chætophora?* Spores killed by iodine. (This and the following are magnified 340 times). Fig. 8. The same, treated with iodine. Fig. 9. Germination. — Fig. 10. *Chætophora elegans var. pisiformis.* Spores killed by iodine. Fig. 11. Germination. — Fig. 12. *Prolifera rivularis.* Spores the ciliæ of which are invisible by reason of the rapid movement. (This and the following figures are magnified 341 times.) Fig. 13. The same, killed with iodine. Fig. 14. The same, treated with iodine, and dried between two plates of glass. Fig. 15. Germination. Figs. 16, 17. Germination more advanced. — Fig. 18. *Prolifera Candollii.* Spores killed with weak iodine. Fig. 19. Germination.

PLATE II.

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with the endochrome slightly condensed. Fig. 22. The extremity has become clavate, and the endochrome considerably condensed, though still continuous with that of the remainder of the filament. Fig. 23. A diaphragm is formed between the endochrome contained in the clavate extremity of the filament and that of the filament itself. Fig. 24. The spore is completely formed, and surrounded by a transparent border. Fig. 25. The spore is represented in the act of escaping from the ruptured extremity of the filaments. Fig. 26. The extremity of the filament subsequent to the escape of the spore. Fig. 27. Spore after its emission: it is enveloped in a granular epispore: the ciliæ are invisible; the colourless extremity is always in advance. Fig. 28. The spore, the movements of which have become retarded. Fig. 29. A spore, the movements of which have been suddenly arrested in iodine water. The ciliæ are distinguished on the margin short and fine, which are the organs of locomotion. Fig. 30. Spore treated with iodine and dried between two plates of glass; the ciliæ have become much more clear, and appear longer by reason of the retraction of the epispore. Fig. 31. Spore preparing to germinate; it has become globular; the colourless portion is no longer to be distinguished, and the epispore has disappeared. Figs. 32, 33. Germination. The extremities of the newly formed filaments are colourless.

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PLATE XXXIX.

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PLATE LXI.

Fig. 1. A portion of *Chara vulgaris*: a, b, c, d, e, f, g, h, indicate the cells in which a circulation somewhat different from that of the ordinary cells is manifest, the current taking a circular instead of its usual spiral course. Fig. 2. One of the sprouts more highly magnified, the arrows indicating the courses of the molecules. Fig. 3. shows the root cells, the currents in these agreeing with those of the stems, due allowance being made for the difference in the direction of their growth. Fig. 4. In fig. 4. the globule is represented in profile with the stalk on which it grows; also the nucule surrounded by its sprouts. Fig. 5. is a view on a large scale of the stalk with a part of the outside or transparent portion of the globule attached to it. Fig. 6. is a cross section of the stalk only, the whole of which is one cell. i, in figs. 5 and 6, indicates the mass which circulates round the cells.—Fig. 7. A portion of a cell of *Chara vulgaris* magnified, j j the internal membrane in its two strips; k k and l l on the tubes, the lines to which their edges adhered: these lines are indents on the outside and ridges within, as shown in the section.—Figs. 8 and 9. A portion of a cell of *Nitella* with the tender green tissue floated out. Figs. 10 and 11. show portions of the denser fluid detached, and forming large spherical balls.

This Plate is copied from Varley.

PLATE LXII.

Figs. 1 and 2. The segments forming the outer coating of the globule magnified. Fig. 3. The filaments contained within the globule. Fig. 4. The same more highly magnified, showing the divisions into which each thread is divided, and also the outlines of the animalcules contained singly in each cell. Figs. 5 and 6. The animalcules more highly magnified displaying the cilia by which their active movements are effected. Figs. 7 and 8. Two of the peculiar cells with the enclosed lateral circulating vesicle.

The figures contained in this plate are taken for the most part from those illustrating M. G. Thuret's paper on the animalcules contained in the anther of *Chara*.

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PLATE LXIV.

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PLATE LXXIII.

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PLATE LXXIV.

Fig. 1. *Nostoc cæruleum.*—Fig. 2. *Nostoc commune.*— Fig. 3. *Nostoc? variegatum.* — Fig. 4. *Nostoc muscorum.*

PLATE LXXV.

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Spirillum minutissimum. — Fig. 9. *Anabaina constricta.* — Fig. 10. *Nostoc cæruleum.* — Fig. 11. *Monormia intricata.*

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PLATE LXXXII.

Fig. 1. *Hæmatococcus rupestris.* — Fig. 2. *Hæmatococcus binalis.* — Fig. 3. *Hæmatococcus æruginosus.* — Fig. 4. *Hæmatococcus furfuraceus.* — Fig. 5. *Hæmatococcus lividus.* — Fig. 6. *Coccochloris protuberans* of the natural size. Figs. 7, 8, 9, 10. The same magnified in different degrees.

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Fig. 3. *Desmidium quadrangulatum: a,* front view; *b,* end view; *c,* two frustules of *D. Swartzii* for comparison. — Fig. 1. *Sphærozosma elegans.* — Fig. 2. *Sphærozosma excavatum.* — Fig. 4. *Closterium Lunula.* — Fig. 5. *Closterium Dianæ.* — Fig. 6. *Merismopedia punctata.* — Fig. 7. *Trigonocystis orbicularis: a,* front view; *b,* end view;

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Fig. 1. *Cosmarium margaritiferum.* — Fig. 2. *Cosmarium Botrytis.* — Fig. 3. *Cosmarium ornatum.* — Fig. 4. *Cosmarium cylindricum.* — Fig. 5. *Cosmarium orbiculatum.* — Fig. 6. *Cosmarium crenatum.* — Fig. 7. *Cosmarium Cucurbita.* — Figs. 8 and 9. *Cosmarium ovale.* — Fig. 10. *Cosmarium Cucumis.* — Fig. 11. *Cosmarium quadratum.* — Fig. 12. *Cosmarium quadratum, var.* — Fig. 13. *Pediastrum Boryanum.* — Fig. 14. *Pediastrum angulosum.* — Figs. 15 and 16. *Pediastrum constrictum.* — Fig. 17. *Pediastrum tetras.* —

Fig. 18. *Pediastrum simplex.* — Fig. 19. *Pediastrum elegans.*

PLATE LXXXVII.

Fig. 1. *Closterium Ehrenbergii.* — Fig. 2. *Closterium moniliferum.* — Fig. 3. *Closterium turgidum.* — Fig. 4. *Closterium striolatum.* — Fig. 5. *Closterium acerosum.* — Fig. 6. *Closterium rostratum.* — Fig. 7. *Closterium setaceum.*

PLATE LXXXVIII.

Fig. 1. *Closterium lineatum.* — Fig. 2. *Closterium Cornu.* — Fig. 3. *Closterium Trabecula.* — Fig. 4. *Closterium Digitus.* — Fig. 5. *Closterium margaritaceum.*

PLATE LXXXIX.

Fig. 1. *Xanthidium furcatum.* — Fig. 2. *Xanthidium fasciculatum?* — Fig. 3. *Xanthidium aculeatum: a,* front view; *b,* end view; *c,* side view; *d,* new segment. — Fig. 4. *Xanthidium polygonum.* — Fig. 6. *Tetmemorus granulatus: a,* front view; *b,* side view; *c,* empty frond; *d,* fronds conjugated, showing mode of formation of the sporangium; *e,* sporangium perfectly formed. — Fig. 5. *Tetmemorus Brebissoni: a,* front view; *b,* side view; *c,* empty frond; *d,* segment of frond.

PLATE XC.

Fig. 1. *Micrasterias rotata: a,* adult frond; *b, c,* young fronds of same; *d,* showing the mode of formation of the new segment. — Fig. 2. *Micrasterias radiata.* — Fig. 3. *Holocystis oscitans?* (*Euastrum crux melitensis,* young, Ehr.) — Fig. 4. *Holocystis oscitans.* — Fig. 5. *Euastrum circulare.* — Fig. 6. *Euastrum.* — Fig. 7. *Micrasterias crux melitensis* (*Euastrum crux melitensis* Ehr.). — Fig. 8. *Euastrum Didelta: a,* front; *b,* side view. — Fig. 9. *Euastrum affine: a,* front; *b,* side view. — Fig. 10. *Euastrum.*

PLATE XCI.

Fig. 1. *Euastrum oblongum: a,* front; *b,* side views; *c,* empty frond. — Fig. 2. *Euastrum insigne.* — Fig. 3. *Euastrum Pelta: a,* front; b, side view; *c,* empty frond. — Fig. 4. *Euastrum binale.* — Fig. 5. *Variety* of same. — Fig. 6. *Euastrum gemmatum: a,* front view; *b,* side ditto; *c, d,* end view; *e, variety.* — Fig. 7. *Euastrum verrucosum: a,* front view of young frond; *b,* ditto of adult frond; *c,* side view; *d,* end view. — Fig. 8. *Euastrum rostratum.* — Fig. 9. *Euastrum spinosum: a, b, d, e, f,* front view, and showing the mode of formation of new fronds; *c,* end view. — Fig. 10. *Euastrum.* — Fig. 11. *Euastrum Didelta: a,* front view; *b,* transverse; *c, d,* end views.

PLATE XCII.

Fig. 1. *Pediastrum tricyclium.* — Fig. 2. *Pediastrum ellipticum.* — Fig. 3. *Pediastrum lunare.* — Fig. 4. *Pediastrum cribriforme.* — Fig. 5. *Pediastrum hexactis.* — Fig. 6. *Pediastrum excavatum.* — Fig. 7. *Pediastrum Rotula.* — Fig. 8. *Pediastrum incisum.* — Fig. 9. *Pediastrum heptactis.* — Fig. 10. *Pediastrum Napoleonis.* — Fig. 11. *Pediastrum Napoleonis var.* — Fig. 12. *Scenedesmus quadricaudatus: a,* frond in its ordinary state; *b, var.* with three spines; *c, var.* destitute of spines. — Fig. 13. *Scenedesmus dimorphus.* — Fig. 14. *Scenedesmus acutus.* — Fig. 15. *Scenedesmus triseriatus.* — Fig. 16. *Scenedesmus obtusus.* — Fig. 17. *Cylindrocystis Brebissoni.*

PLATE XCIII.

Fig. 1. *Sphærophora globulifera.* — Fig. 2. A portion of a filament of *Meloseira arenosa.* Fig. 3. End view of a frustule of the same. — Figs. 4 and 5. *Meloseira varians.* — Figs. 6 and 7. *Meloseira orichalcea.* — Figs. 8 and 9. *Tetracyclus lacustris.* — Fig. 10. *Bacillaria paradoxa.*

PLATE XCIV.

Fig. 1. *Diatoma vulgare.* Fig. 2. The same as in a more advanced stage of its developement. — Fig. 3. *Diatoma*

elongatum, at the period of its perfect developement. Fig. 4. The same in a younger condition. Fig. 6. The same with the frustules thrown back. Fig. 5. The same, var. *cuneatum*.—Figs. 7 and 8. States of *Diatoma virescens?* —Fig. 9. *Tabellaria flocculosum*, in an early period of its growth. Fig. 10. The same in a more advanced period of its developement.

PLATE XCV.

Fig. 1. *Fragilaria pectinalis*, showing the striæ on the anterior surface of the frustules. Fig. 2. The same. Fig. 3. Showing the oblique division of the frustules which occasionally takes place. Fig. 4. An interesting condition of the same: *a a*, end view of frustules of the species in its ordinary state; *b*, the same of frustules of the variety *β undulata*.—Fig. 5. Filaments of *Fragilaria hyemalis: a*, front view; *b*, end view of frustules of the same.—Fig. 6. *Fragilaria rhabdosoma: a*, front view; *b*, end view.—Figs. 7 and 8. Successive stages of the developement of *Diatoma virescens: a a a*, front views; *b b*, end views of frustules of the same.

PLATE XCVI.

Figs. 1 to 4. Portions of *Meridion circulare* of different ages. Fig. 5. Frustules of a condition of the same. Fig. 6.: *a a*, front view of two frustules of the same: *b b*, side view of the same.—Figs. 7 and 8. Fronds of *Meridion constrictum*. Fig. 9.: *a c*, front view of two frustules of the same: *b d*, end view of the same.—Fig. 10. *Tabellaria fenestratum: a*, front view; *b*, end view of a frustule of the same.—Fig. 11. *Tabellaria flocculosum* in the most advanced stage of its developement: *a* front view; *b*, end view of a frustule of the same.

PLATE XCVII.

Fig. 1. *Exilaria capitata*.—Fig. 2. *Exilaria Ulna*.—Fig. 3. *Exilaria fasciculata*.—Fig. 4. *Exilaria lunaris*.—Fig. 5.

Eunotia arcus: a, front view; *b,* side view. — Fig. 6. *Eunotia diodon: a,* front view; *b,* side view. — Fig. 7. *Eunotia triodon: a,* front view; *b,* side view. — Fig. 8. *Eunotia tetraodon: a,* front view; *b,* side view; *c,* oblique view.

PLATE XCVIII.

Fig. 1. *Gomphonema geminatum.* — Fig. 2. *Gomphonema truncatum.*

PLATE XCIX.

Fig. 1. *Gomphonema acuminatum.* — Fig. 2. *Gomphonema dichotomum.*

PLATE C.

Fig. 1. *Gomphonema cristatum.* — Fig. 2. *Gomphonema Berkeleyi.* — Fig. 3. *Gomphonema minutissimum.* — Fig. 4. *Achnanthes minutissima.* — Fig. 5. *Achnanthes exilis?* — Fig. 6. *Cymbella Arcus: a,* front view; *b,* side view. — Fig. 7. *Cymbella turgida: a, a,* front view; *b,* side view. — Fig. 8. *Cymbella zebra: a,* front view; *b,* side view. — Fig. 9. *Podosphenia? ocellatum.* — Fig. 10. *Encyonema prostratum.*

PLATE CI.

Fig. 1. *Cocconema lanceolatum.* — Fig. 2. *Cocconema cymbiforme.* — Fig. 3. *Cocconema Cistula.* — Fig. 4. *Cocconema ventricosum.*

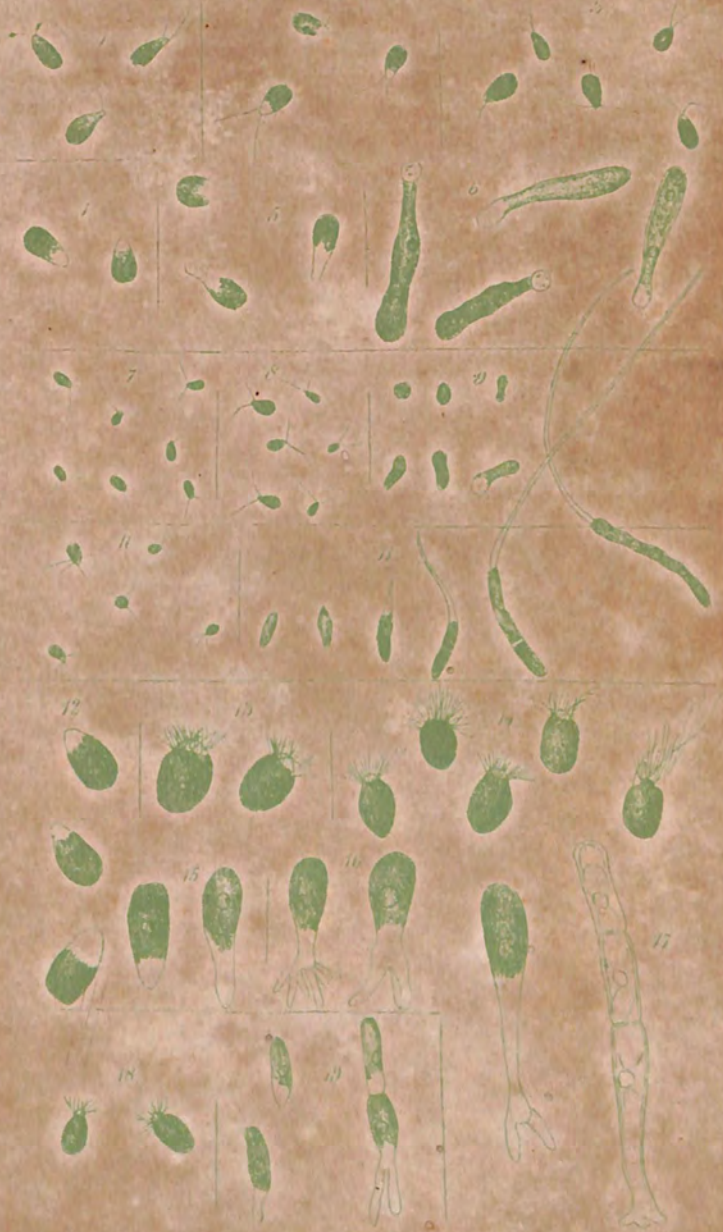
PLATE CII.

Fig. 1. *Surirella biseriata: a,* front view; *b,* side view. — Fig. 2.: *a, b, c. Frustulia viridis.* — Fig. 3. *Sphinctocystis librilis: a,* front view; *b,* side view. — Fig. 4. *Navicula? gibba.* — Fig. 5. *Navicula amphisbæna: a,* front view; *b,* side view. — Fig. 6. *Navicula platystoma.* — Fig. 7. *Navicula? nodosa.* — Fig. 8. *Aulacocystis pellucida.* — Fig. 9. *Navicula phœnicenteron.* — Fig. 10. *Navicula Palea.* —

Fig. 11. *Gyrosigma Hippocampa: a*, front view; *b*, side view.—Fig. 12. *Nitzschia elongata: a*, front view; *b*, side view. — Fig. 13. *Navicula inequalis.* — Fig. 14. *Navicula lanceolata.* — Fig. 15. *Surirella Jenneri: a*, front view; *b*, end view. — Fig. 16. *Navicula.*

PLATE CIII.

Figs. 1 and 2. *Zygnema insigne.*—Fig. 3. *Coccochloris cystifera.*—Fig. 4. *Coccochloris variabilis.*—Fig. 5. *Coccochloris obscura.*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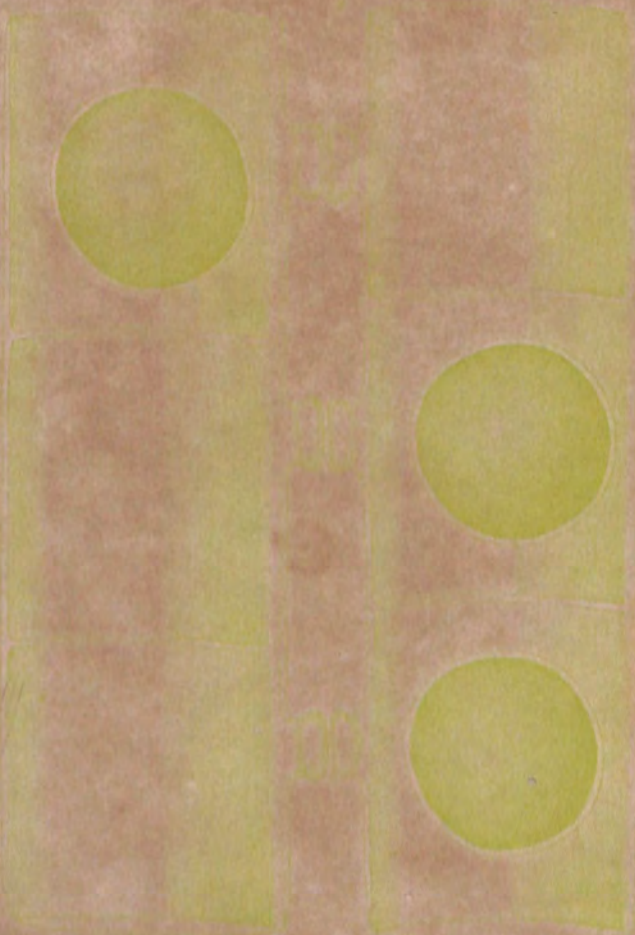

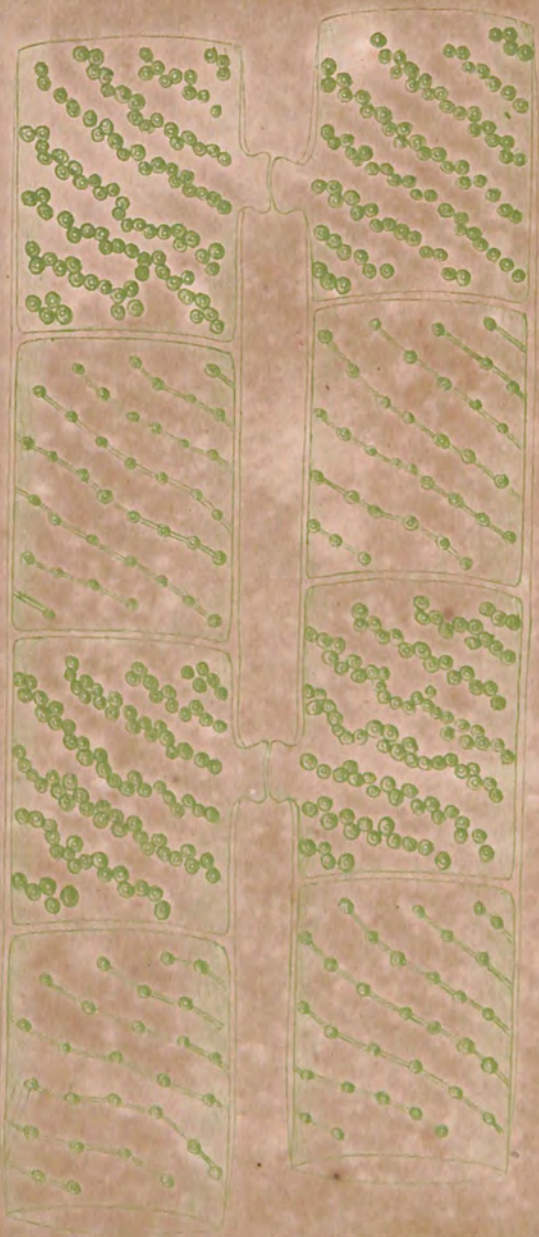

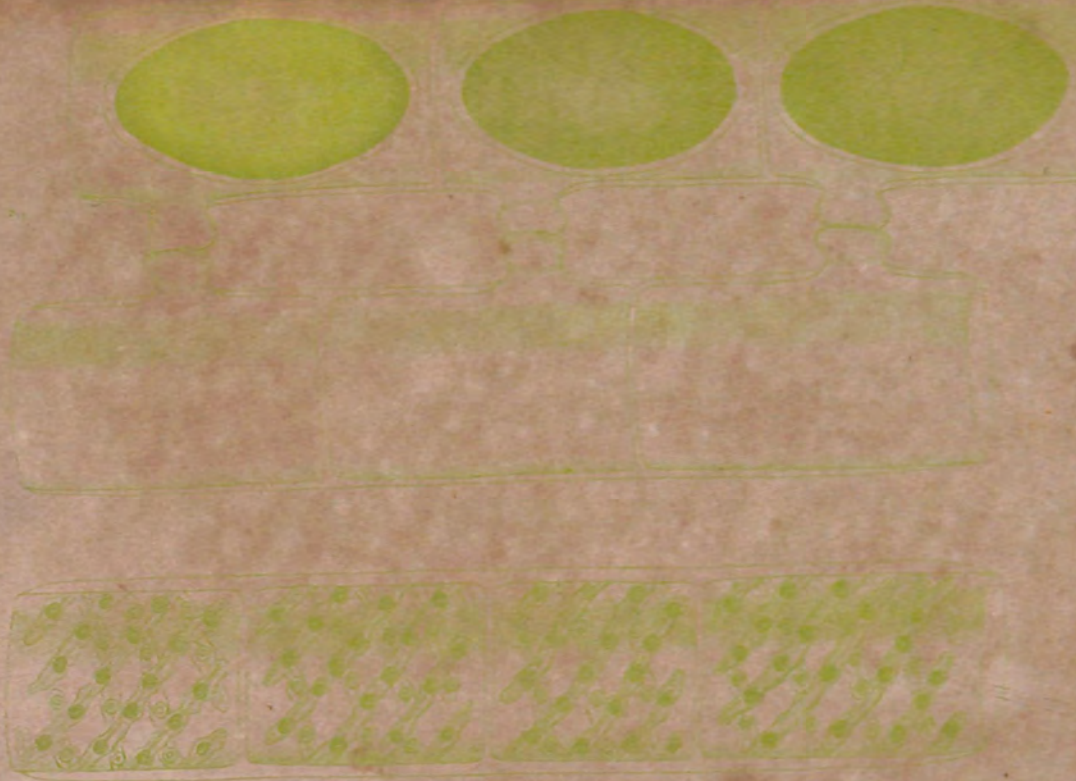

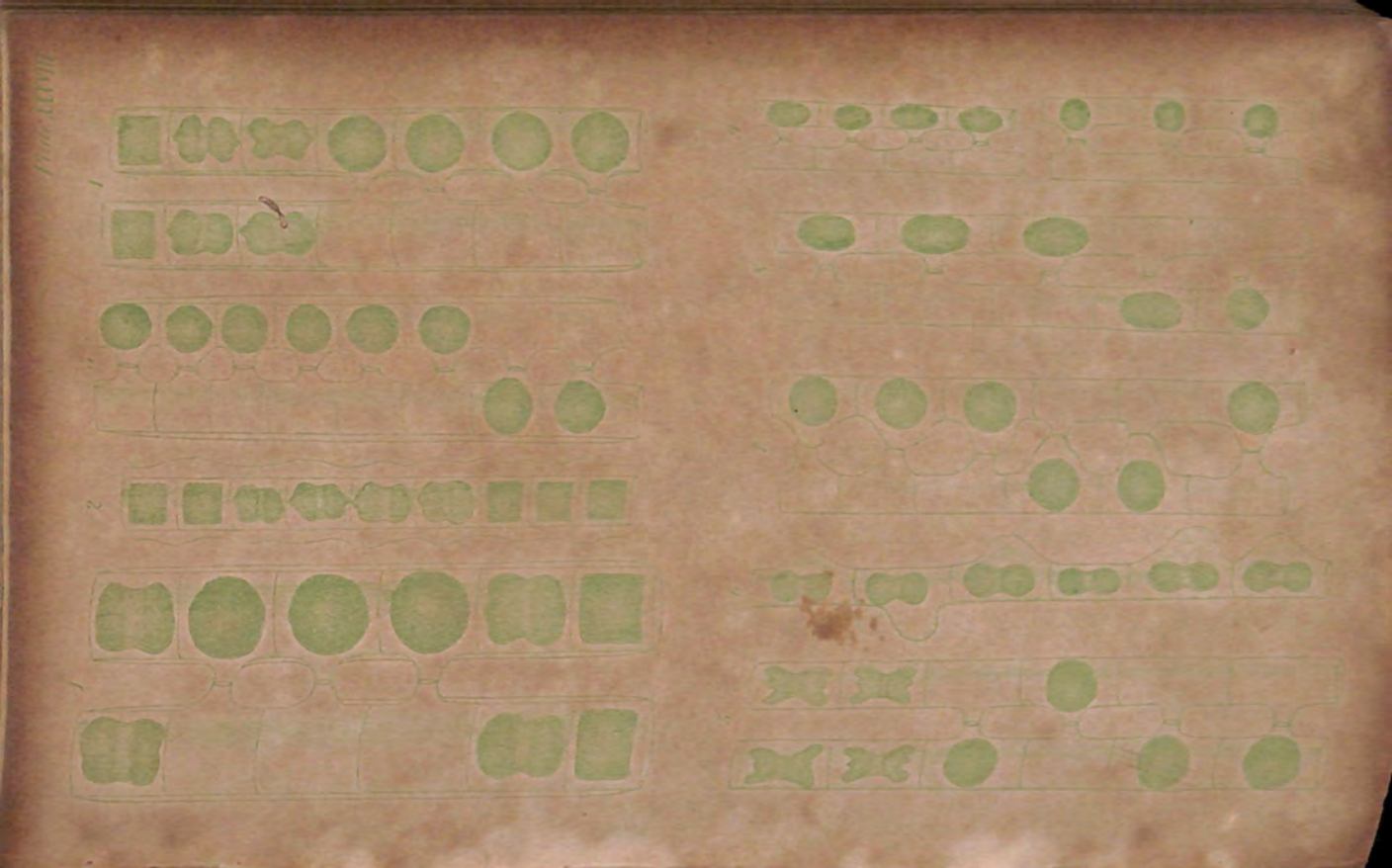

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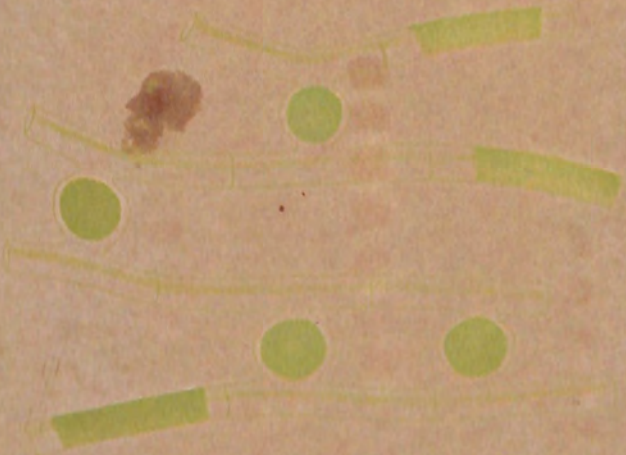
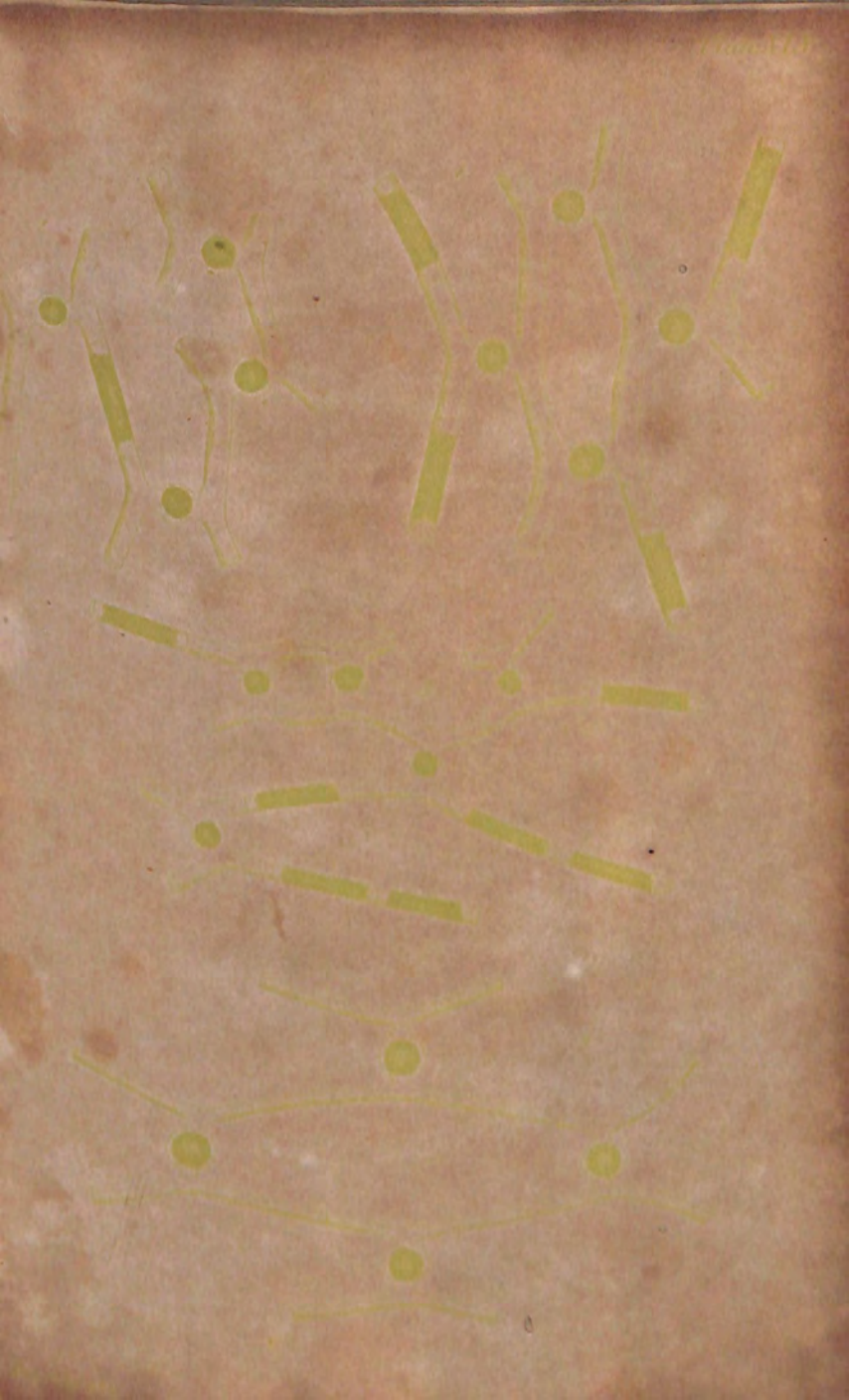
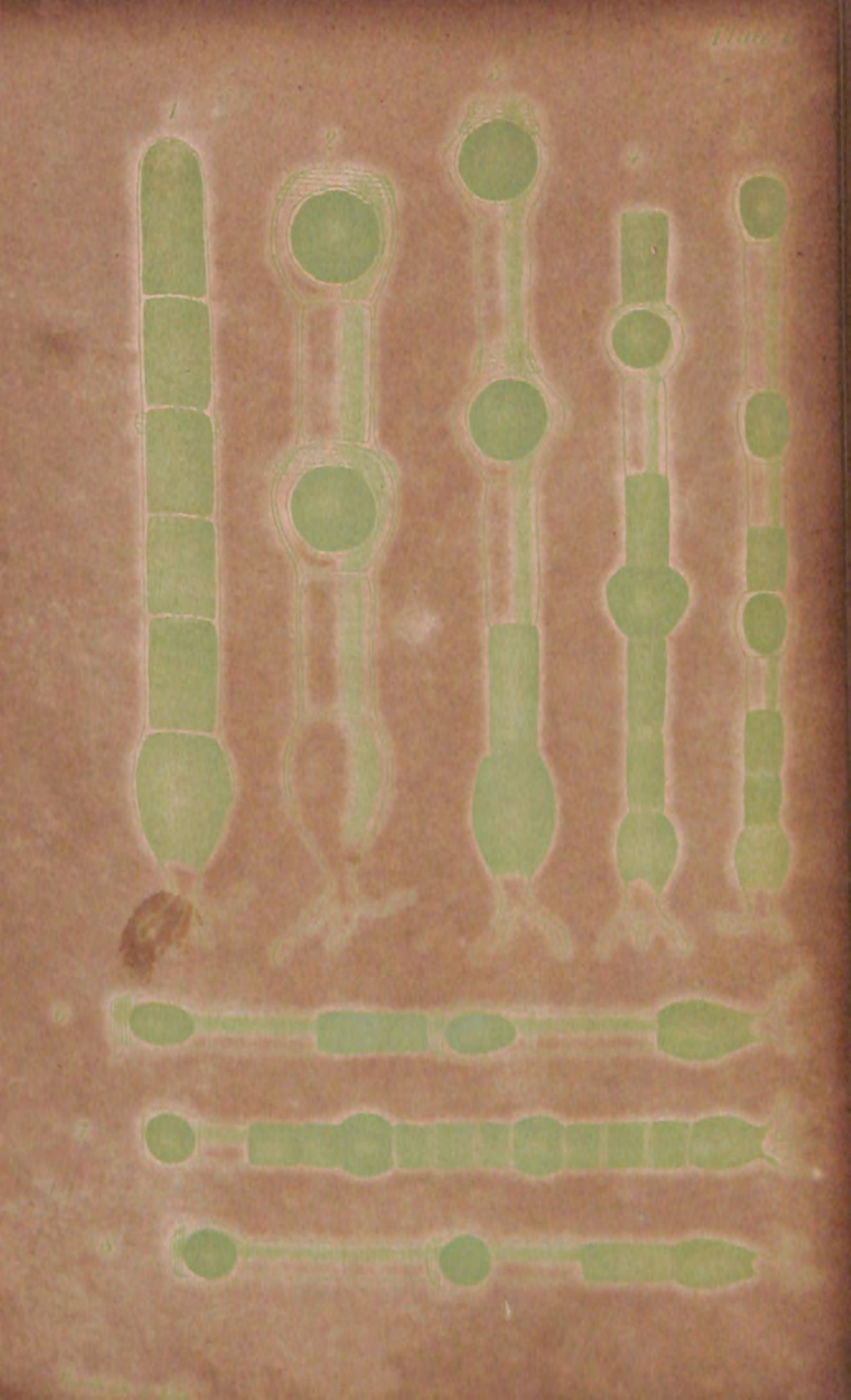
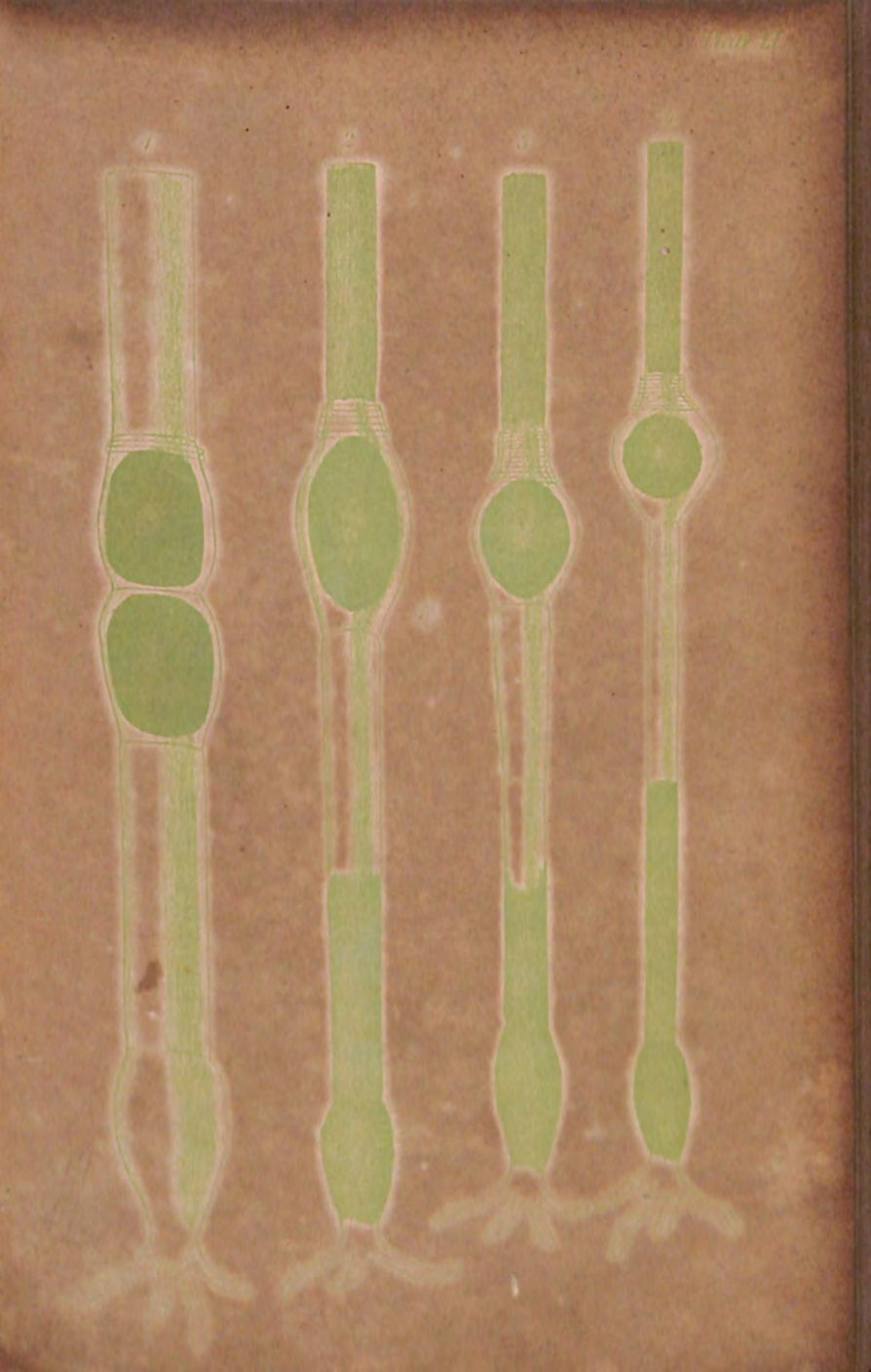
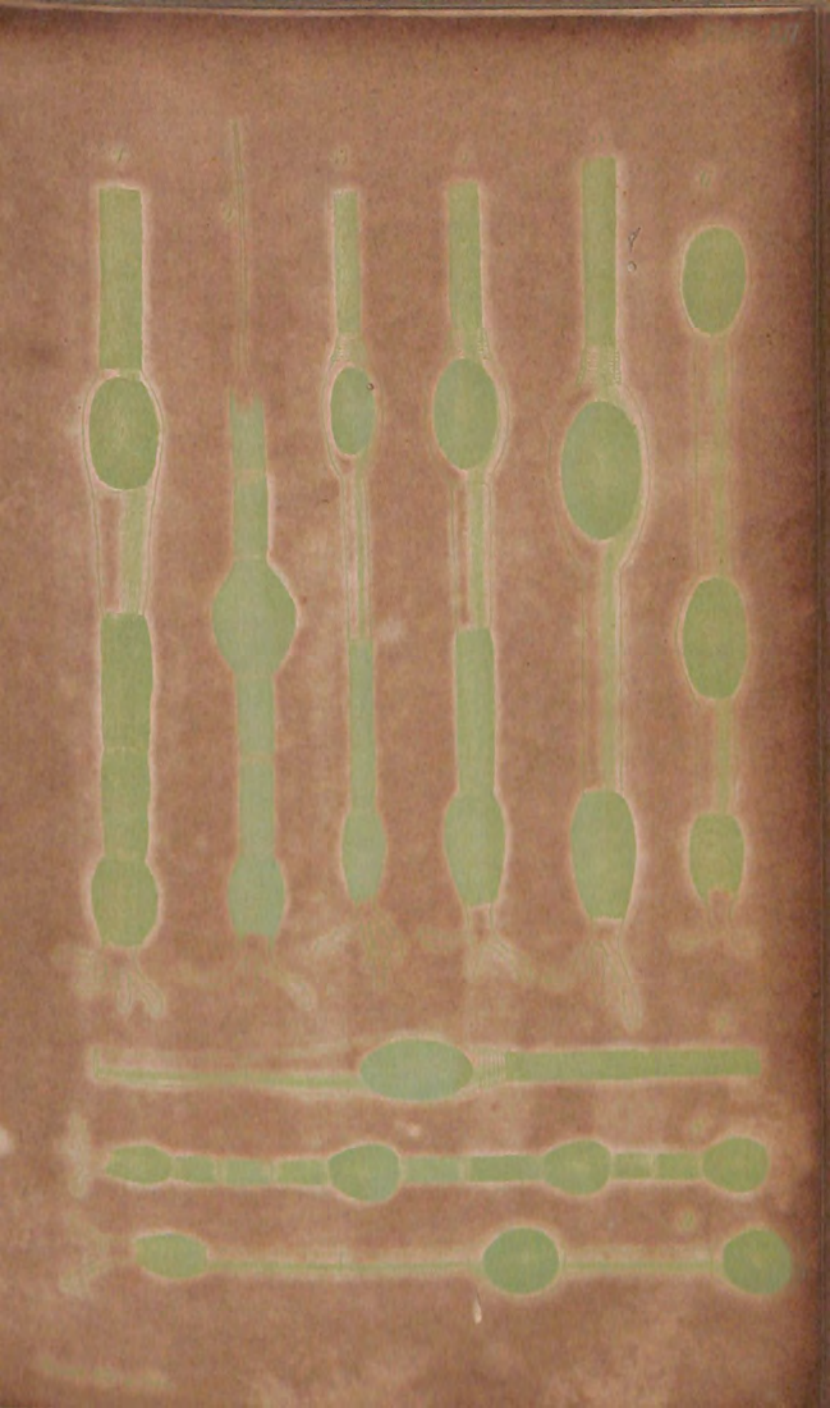










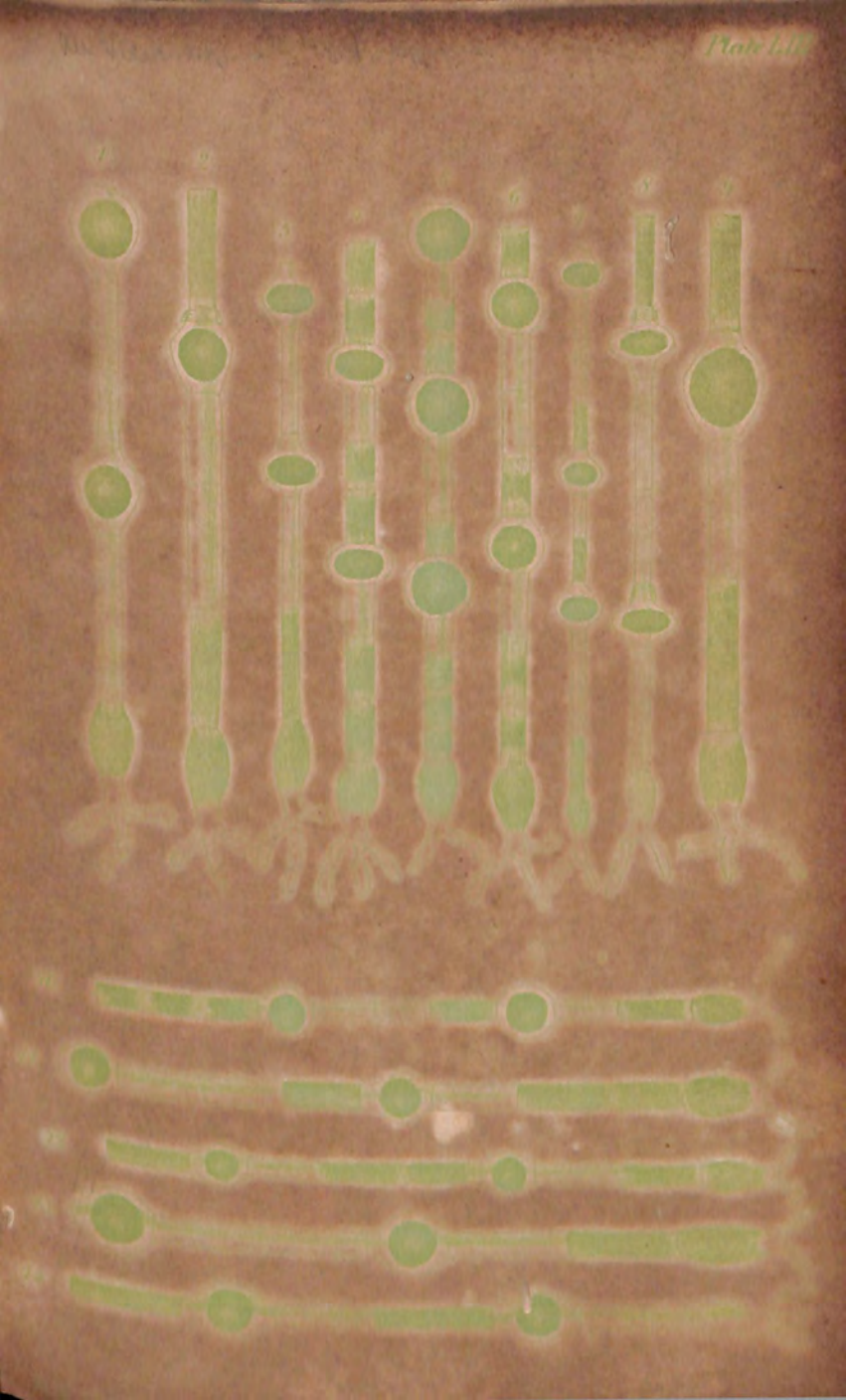
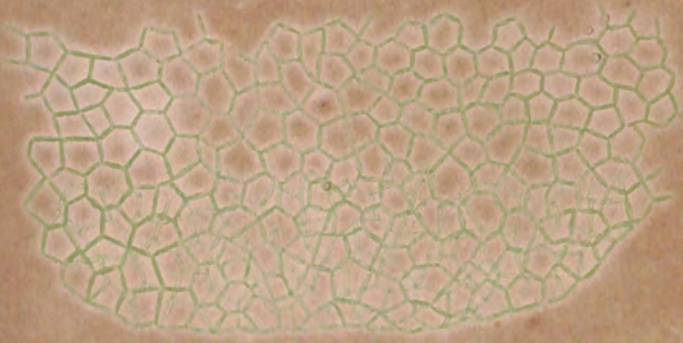


Plate LVI



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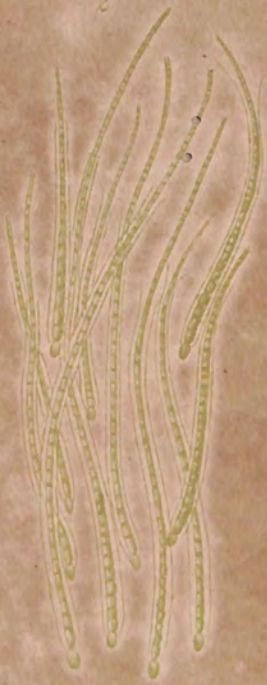

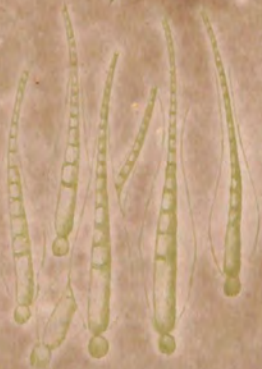

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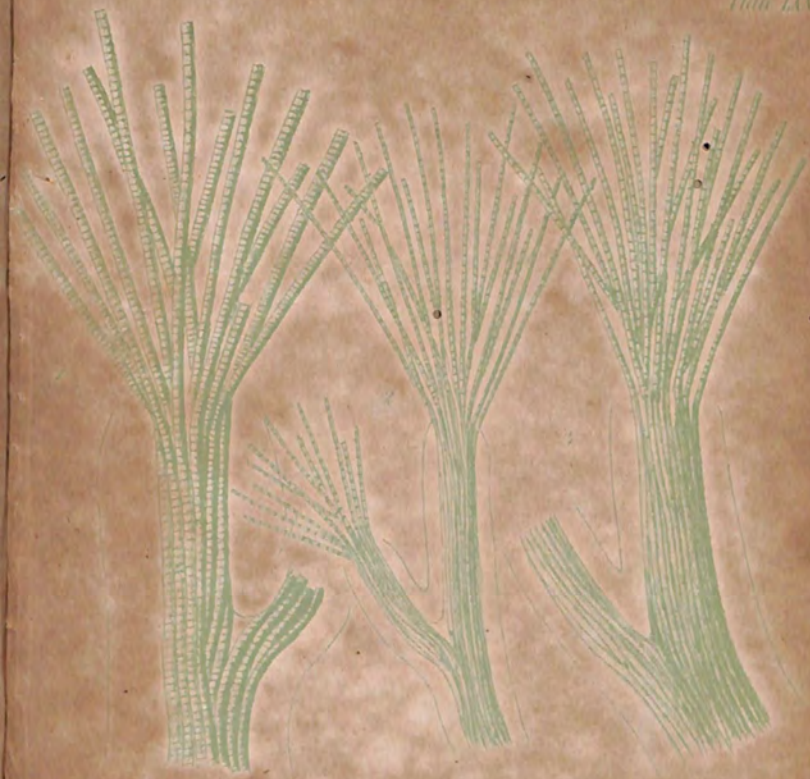

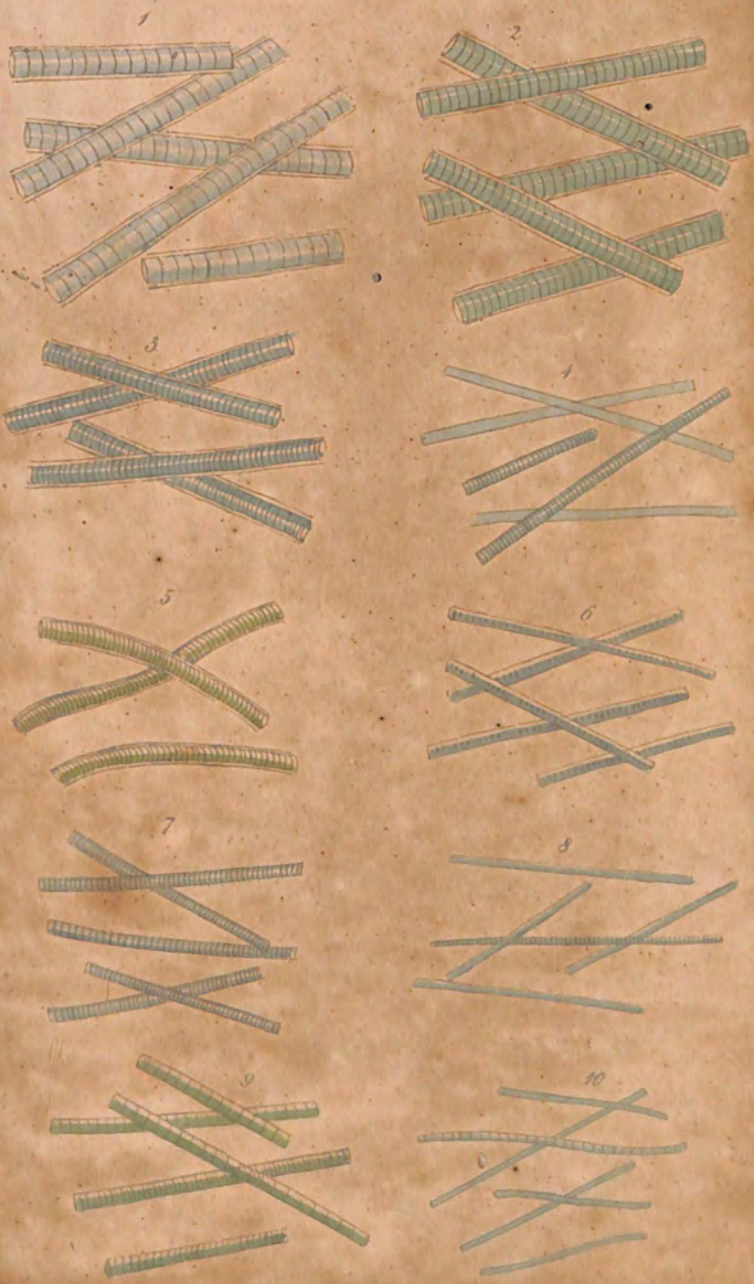
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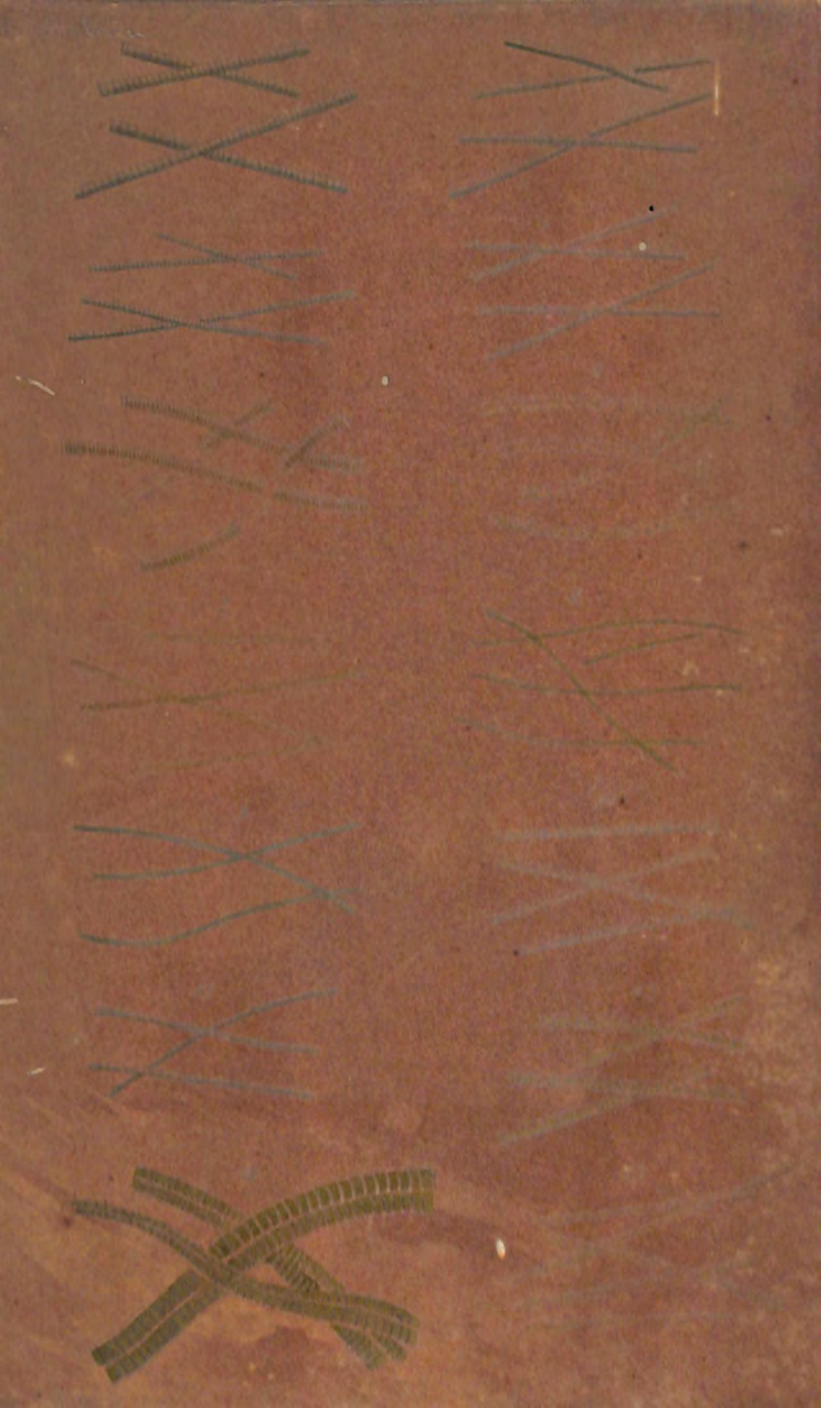

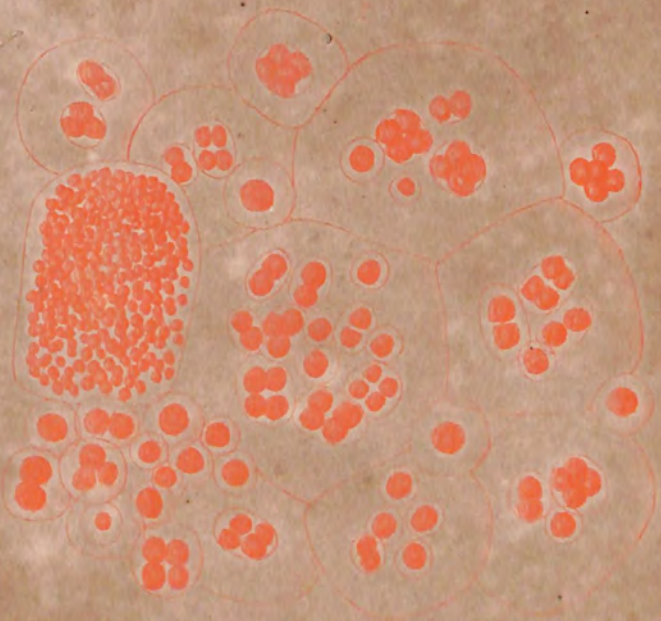

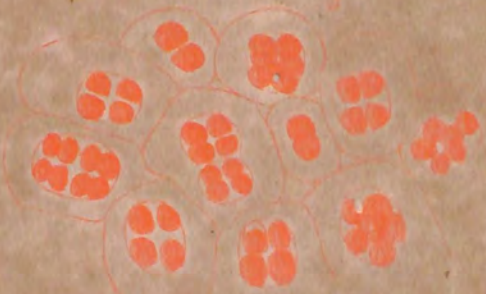

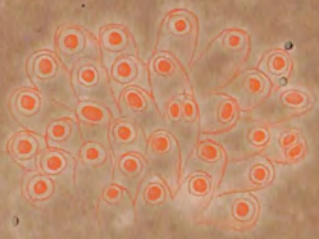

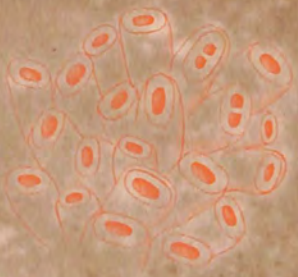

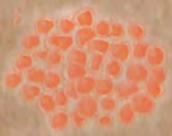

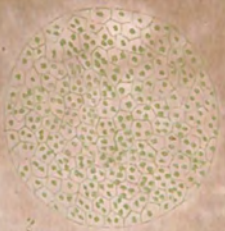
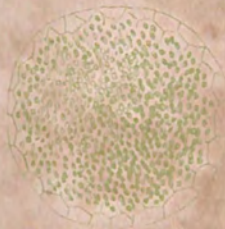
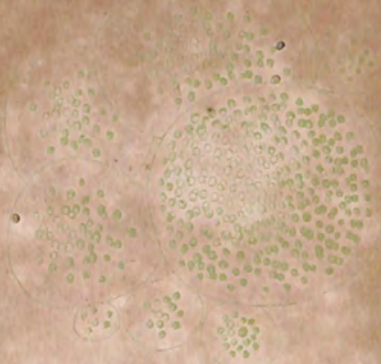

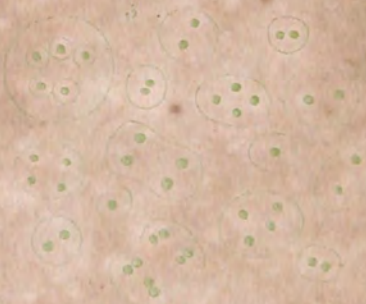

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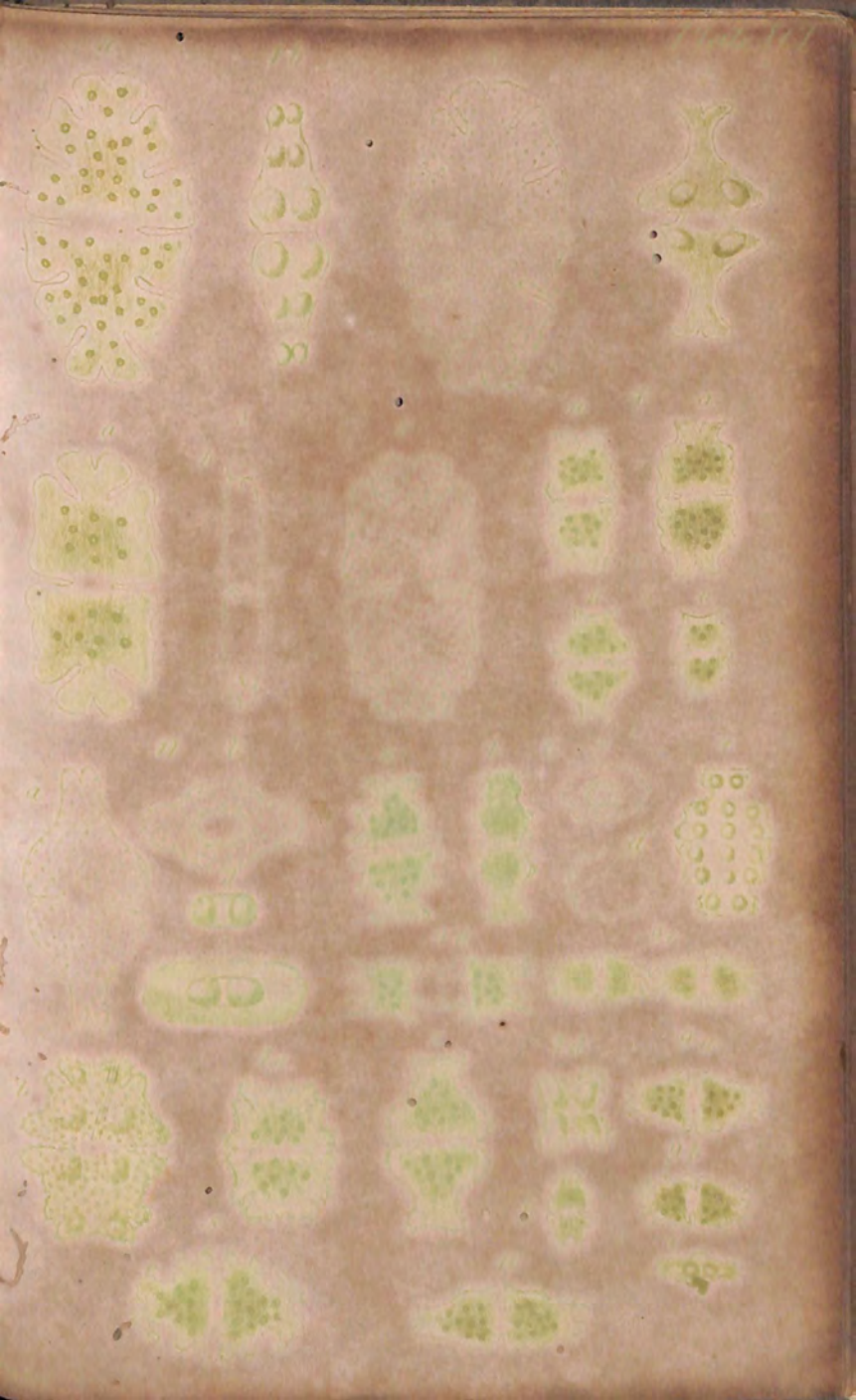

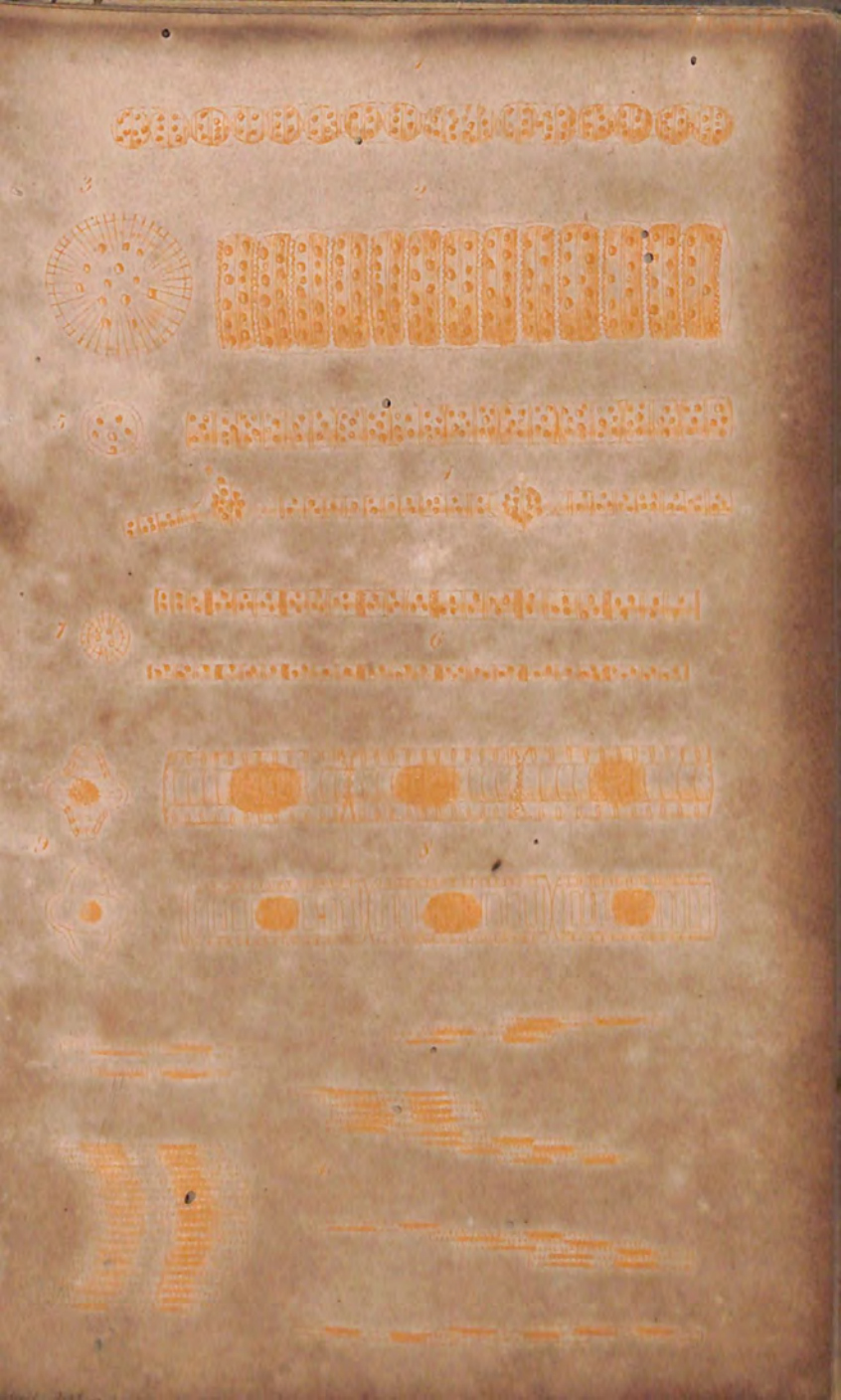

Plate

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